CLAIMS

CLAIM 1. A worm/worm gear assembly, comprising:

a worm having a plurality of teeth defined by at least one thread disposed thereon; and

a single part worm gear having a plurality of uninterrupted teeth flexibly disposed thereon, said teeth of said worm gear being disposed in outboard mechanical double flank communication with said teeth of said worm.

CLAIM 2. The worm/worm gear assembly of claim 1 wherein each of said teeth includes a first flank surface and an opposing second flank surface, and wherein each of said teeth of said worm gear includes a first flank surface and an opposing second flank surface, said mechanical communication being maintained such that contact is made between said first flank surface of at least one of said teeth of said worm and said first flank surface of at least one of said teeth of said worm gear, and such that contact is made between said opposing second flank surface of said at least one of said teeth of said worm and a flank surface facing said first flank surface of said at least one tooth of said worm gear on a successive tooth of said worm gear.

CLAIM 3. The worm/worm gear assembly of claim 2 wherein the contact made between said first flank surface of at least one of said teeth of said worm and said first flank surface of at least one of said teeth of said worm gear is at opposing outer edges of said worm and said worm gear, and wherein the contact made between said opposing second flank of said at least one of said teeth of said worm and said flank surface facing said first flank surface of said at least one tooth of said worm gear on said successive tooth of said worm gear is at said opposing outer edges of said worm and said worm gear.

CLAIM 4. The worm/worm gear assembly of claim 2 wherein said flank surfaces of each of said teeth of said worm are convexly arcuately formed.

CLAIM 5. The worm/worm gear assembly of claim 4 wherein said flank surfaces of each of said teeth of said worm gear are concavely arcuately formed to substantially correspond with said convexly arcuately formed flank surfaces of each of said teeth of said worm.

CLAIM 6. The worm/worm gear assembly of claim 1 wherein a helix angle of said worm is less than a helix angle of said worm gear.

CLAIM 7. The worm/worm gear assembly of claim 6 wherein said helix angle of said worm is less than said helix angle of said worm gear by about 0.5 degrees to about 2.0 degrees.

CLAIM 8. The worm/worm gear assembly of claim 2 wherein a compressive relationship is maintained between said worm and said worm gear.

CLAIM 9. The worm/worm gear assembly of claim 2 wherein a helix angle of said worm is skewed relative to a helix angle of said worm gear.

CLAIM 10. The worm/worm gear assembly of claim 2 wherein an axis of rotation of said worm gear is skewed relative to an axis of rotation of said worm.

CLAIM 11. The worm/worm gear assembly of claim 1 wherein at least one of said gear and said worm gear are fabricated from a resilient material.

CLAIM 12. The worm/worm gear assembly of claim 2 wherein the contact maintained between said first flank surface of at least one of said teeth of said worm and said first flank surface of at least one of said teeth of said worm gear extends from opposing outer edges of said worm and said worm gear to a point intermediate opposing outer edges of said worm and said worm gear, and wherein the contact maintained between said opposing second flank of said at least one of said teeth of said worm and said flank surface facing said first flank surface of said at least one tooth of said worm gear on said successive tooth of said worm gear extends from opposing outer edges of said worm and said worm gear to a point intermediate said opposing outer edges of said worm and said worm gear.

CLAIM 13. The worm/worm gear assembly of claim 12 wherein said flank surfaces of each of said teeth of said worm are convexly arcuately formed.

CLAIM 14. The worm/worm gear assembly of claim 13 wherein said flank surfaces of each of said teeth of said worm gear are concavely arcuately formed to substantially correspond with said flank surfaces of each of said teeth of said worm.

CLAIM 15. The worm/worm gear assembly of claim 12 wherein a helix angle of said worm is less than a helix angle of said worm gear.

CLAIM 16. The worm/worm gear assembly of claim 15 wherein said helix angle of said worm is less than said helix angle of said worm gear by about 0.5 degrees to about 2.0 degrees.

CLAIM 17. The worm/worm gear assembly of claim 12 wherein a compressive relationship is maintained between said worm and said worm gear.

CLAIM 18. The worm/worm gear assembly of claim 12 wherein a helix angle of said worm is skewed relative to a helix angle of said worm gear.

CLAIM 19. The worm/worm gear assembly of claim 12 wherein an axis of rotation of said worm gear is skewed relative to an axis of rotation of said worm.

CLAIM 20. The worm/worm gear assembly of claim 12 wherein at least one of said gear and said worm gear are fabricated from a resilient material.

CLAIM 21. The worm/worm gear assembly of claim 12 wherein said worm/worm gear assembly is reversibly operable.

CLAIM 22. A worm/worm gear assembly, comprising:

a worm; and

a worm gear maintained in double flank contact with said worm and wherein a no-load or a low-load condition is carried at a low spring rate and a higher load condition is carried at a higher spring rate.

CLAIM 23. The worm/worm gear assembly of claim 22 further comprising lower load contact areas in first locations on gear teeth of said worm and said worm gear and higher load contact areas at second locations on gear teeth of said worm and said worm gear, said first location and said second location being located on a single surface of each of said gear teeth.

CLAIM 24. The worm/worm gear assembly of claim 22 wherein said spring rate increases as said load increases, said spring rate increasing in proportion to a deflection of teeth of said worm gear.

CLAIM 25. The worm/worm gear assembly of claim 22 wherein said worm and said worm gear each include a plurality of teeth, each of said teeth including a first flank surface and an opposing second flank surface, and wherein mechanical communication is maintained such that contact is made between said first flank surface of at least one of said teeth of said worm gear and said first flank surface of at least one of said teeth of said worm, and such that contact is made between said opposing second flank surface of said at least one of said teeth of said worm and a flank surface facing said first flank surface of said at least one tooth of said worm gear on a successive tooth of said worm gear.

CLAIM 26. A single part gear capable of reducing backlash, comprising: a plurality of teeth disposed on an outer edge thereof, each tooth of said plurality of teeth having two arcuately-formed flank surfaces and being efficiently operable when combined with a worm from no-load conditions through higher load conditions.

CLAIM 27. The gear of claim 26 wherein a first of said arcuately-formed flank surfaces on said tooth of said gear is configured and positionable to engage a first flank surface of a tooth on a mating gear, and wherein a first arcuately-formed facing flank surface on a successive tooth of said gear is configured and positionable to engage a second opposing flank surface of a tooth on said mating gear that is successive to said first tooth on said mating gear.

CLAIM 28. The gear of claim 26 wherein said at least one arcuately-formed flank surface is concave relative to said tooth.

CLAIM 29. The gear of claim 26 wherein said at least one arcuately-formed flank surface is convex relative to said tooth.

CLAIM 30. The gear of claim 26 wherein said arcuately-formed flank surface is uninterrupted.

CLAIM 31. The gear of claim 26 wherein said gear is configured to be run in double flank contact with a worm.

CLAIM 32. An operable worm gear efficient at no- or low-load conditions and at higher load conditions configurable to engage in double flank contact with a worm to eliminate backlash between said operable worm gear and said worm, comprising:

a body portion;

a plurality of teeth disposed on said body portion, said plurality of teeth being formed of a resilient material.

CLAIM 33. The operable worm gear of claim 32 wherein each tooth of said plurality of teeth includes continuous flank surfaces.

CLAIM 34. The operable worm gear of claim 32 wherein said teeth are concavely-formed relative to each tooth of said plurality of teeth.

CLAIM 35. The operable worm gear of claim 34 wherein said plurality of teeth are flexibly disposed on said body portion.

CLAIM 36. The operable worm gear of claim 35 wherein each tooth of said plurality of teeth has a spring rate associated therewith, said spring rate increasing with increasing deflection of each tooth of said plurality of teeth.

CLAIM 37. The operable worm gear of claim 36 wherein said spring rate is variably dependent upon at least one of a helical angle of said helical thread and the concavity of each of said teeth of said plurality of teeth.

CLAIM 38. A worm/worm gear assembly, comprising:

a worm; and

a worm gear, said worm gear being engaged in double flank contact with said worm, and wherein at a low-load condition a contact area between a tooth of said worm and a tooth of said worm gear is smaller in size than said contact area is at a higher load condition.

CLAIM 39. A worm/worm gear assembly having low turning torque, low rattle, and low noise, comprising:

a worm having at least one helical tooth; and

a flexible helical cut worm gear, in double flank contact with said worm, and wherein a helix angle of said worm helical tooth is less than a helix angle of said helical cut worm gear.

CLAIM 40. A method of delashing a gear system, comprising: disposing a worm in compressive mechanical communication with a worm gear.

CLAIM 41. The method of claim 40 wherein said disposing of said worm in compressive mechanical communication with said worm gear comprises causing opposing flanks of a tooth of said worm to engage facing flanks of two successive teeth of said worm gear.

CLAIM 42. The method of claim 41 wherein a compressive relationship is maintained between said worm and said worm gear.

CLAIM 43. The method of claim 41 wherein a helix angle of said worm is skewed relative to a helix angle of said worm gear.

CLAIM 44. The method of claim 41 wherein an axis of rotation of said worm gear is skewed relative to an axis of rotation of said worm.